

REMARKS

Claims 1-20 are pending in the present application. Claims 16-20 are herein canceled. Claims 1, 2, and 4-15 are rejected. Claims 1-3, 5, 7, 9 and 13 are rejected to. Claims 1, 2, 5, 7, 8, 9, 11 and 13 are herein amended. New claim 21 is herein added. No new matter has been entered.

Claim Rejections – 35 U.S.C. §112

Claim 8 is amended so that the second “gap” in the ratio is claiming a gap measured horizontally in the region where the gate electrode and the device region overlap each other, which is the same region as in claim 1, and the peripheral part of the metal layer.

Claim 9 is amended in connection with the first metal layer in the same way as claim 8. New claim 21 recites the limitation as to the gap in connection with the second metal layer similar to claims 8 and 9.

Claim Rejections – 35 U.S.C. §102

Claims 1, 6, 8, 10, 12 and 14 are rejected under 35 U.S.C. §102(b) as being anticipated by JP-09252131-A.

Applicants herein amend claims 1, 2, 5, 7, 8, 9, 11 and 13. Thereafter, Applicants submit that the rejection has been overcome because not all of the claimed elements are taught or suggested by the cited reference.

Applicants note that claim 1 is amended so as to include the limitation that hydrogen termination of an interface between the semiconductor substrate and the gate insulation film by hydrogen annealing is suppressed. The present invention according to claim 1 is substantially different from JP-09252131-A in terms of the state of hydrogen termination of the interface between the semiconductor substrate and the gate insulation film.

In the present invention according to claim 1, hydrogen termination of any interface between the semiconductor substrate and the gate insulation film by hydrogen annealing is homogeneously suppressed by the metal layer formed of a metal material having the property of occluding hydrogen. Due to the homogenous suppression of hydrogen termination by the metal layer, insufficient hydrogen termination of the interface between the semiconductor substrate and the gate insulation film fails to occur, and the transistor can have high relative accuracy.

On the other hand JP-09252131-A discloses that dangling bonds at the interface between a substrate surface and a gate insulating film are sufficiently terminated by setting hydrogen concentration of annealing atmosphere considering hydrogen amount occluded by titanium layer formed over MOS transistor. That is, JP-09252131-A merely discloses the art quite contrary to the present invention regarding the termination state of the interface between the substrate surface and the gate insulation film. In addition, the cover layer 16Q in JP-09252131-A is formed for suppressing intrusion of moisture into the transistor T. The cover layer 16Q does not suppress hydrogen termination of the interface between the substrate surface and the gate insulation film, and does not function as the metal layer in the present invention according to claim 1.

As described above, JP-09252131-A fails to disclose all the features of the present invention according to claim 1. Accordingly, it is clear that the present invention according to claim 12 and its dependent claims 6, 8, 10, 12 and 14 cannot be anticipated by JP-09252131-A.

Claim Rejections – 35 U.S.C. §103

Claims 2, 7, 9, 11, 13 and 15 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP-09252131-A and further in view of Lockwood (USP 3,996,482).

Applicants herein amend claims 1, 2, 5, 7, 8, 9, 11 and 13. Thereafter, Applicants submit that the rejection has been overcome because not all of the claimed elements are taught or suggested by the cited reference.

Claim 2 is herein amended in the same way as claim 1 so as to include the limitation that hydrogen termination of interfaces between the semiconductor substrate and the first and second gate insulating films by hydrogen annealing is suppressed.

Applicant note the argument as used above in the rejection of claim 1, and conclude that the present invention according to claim 2 is substantially different from JP-09252131-A in terms of the state of hydrogen termination of the interface between the semiconductor substrate and the gate insulation film.

Therefore, even if JP-09252131-A was combined with Lockwood simply disclosing multiple transistors, it is clear that the present invention according to claim 2, and its dependent claims 7, 9, 11, 13, 15 and 21 would have been unobvious to one of ordinary skill in the art at the time the invention was made.

Claim 4 is rejected under 35 U.S.C. §103(a) as being unpatentable over JP-09252131-A and further in view of Dixit et al. (US 2002/0185664 A1)

As described above, JP-09252131-A fails to disclose all the features of the present invention according to claim 1, and Applicants submit that it is clear that the present invention according to claim 2 cannot be anticipated by JP-09252131-A.

Therefore, even if JP-09252131-A was combined with Dixit et al. teaching the connection of dummy metal to ground, it is clear that the present invention according to claim 4 dependent from claim 1 would have been unobvious to one of ordinary skill in the art at the time the invention was made.

Claim 5 is rejected under 35 U.S.C. §103(a) as being unpatentable over JP-09252131-A in view of Lockwood (USP 3,996,482) and further in view of Dixit et al. (US 2002/0185664 A1).

As described above, even if JP-09252131-A was combined with Lockwood, it is clear that the present invention according to claim 2 would have been unobvious to one of ordinary skill in the art at the time the invention was made.

Therefore, even if JP-09252131-A was combined with Lockwood and further with Dixit et al. teaching the connection of dummy metal to ground, it is clear that the present invention according to claim 5 dependent from claim 2 would have been unobvious to one of ordinary skill in the art at the time the invention was made.

Application No. 10/781,811
Group Art Unit: 2815

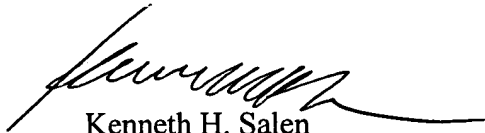
Response under 37 C.F.R. §1.111
Attorney Docket No. 042123

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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